

drawn from evil and corrupting influences, and disciplined in habits of order, attention and cleanliness, but they receive such an amount of positive instruction as greatly facilitates their progress in the more advanced schools. There appears to be no doubt that by regular attendance in an infant school, provided with efficient teachers, a large proportion of ordinary children of six or seven years of age may be enabled to pass in the first standard of the new code.

The inducements which lead parents to keep older children from school are almost wholly absent in the cases of those under seven years of age, who are able to earn little or nothing, and are of no use in the house. And the fact that the younger children are taken care of in an infant school will often remove one of the chief difficulties in the way of securing the regular attendance of the elder girls of a family at the junior and senior schools.

The subjects in which we recommend that instruction should be given in infant schools are:—

- a. Morality and religion.
- b. Reading, writing, and arithmetic.
- c. Object lessons of a simple character, with some such exercise of the hands and eyes as is given in the "Kinder-Garten" system.

In addition, the general recommendations respecting music and drill apply to infant schools, in which singing and physical exercises, adapted to the tender years of the children, are of paramount importance.

JUNIOR AND SENIOR SCHOOLS.—We recommend that certain kinds of instruction shall form an essential part of the teaching of every elementary school; while others may or may not be added to them, at the discretion of the managers of individual schools, or by the special direction of the Board.

A. ESSENTIAL SUBJECTS.

- a. Morality and religion.
- b. Reading, writing, and arithmetic: English grammar in senior schools; with mensuration in senior boys' schools.
- c. Systematised object lessons, embracing in the six school years a course of elementary instruction in physical science, and serving as an introduction to the science examinations which are conducted by the Science and Art Department.
- d. The History of Britain.
- e. Elementary geography.
- f. Elementary social economy.
- g. Elementary drawing, leading up to the examinations in mechanical drawing, and to the art teaching of the Science and Art Department.

h. In girls' schools, plain needlework and cutting out.

B. DISCRETIONARY SUBJECTS, which may be taught to advanced scholars.

- a. Algebra and geometry.
- b. Latin or a modern language.

II.—PUBLIC ELEMENTARY EVENING SCHOOLS

Evening Schools are of great importance, partly as a means of providing elementary education for those who, for various reasons, fail to obtain sufficient instruction in elementary day schools; and, partly, because it is easy to connect with such schools special classes in which a higher kind of instruction than that contemplated by the Sixth Standard can be given to the more intelligent and older scholars. In this manner the advantages of further instruction may be secured by those scholars who are unable or unwilling to go into secondary schools, but who are both able and willing to pay for instruction of a more advanced kind than that given in primary schools.

We recommend that the course of instruction in these evening schools shall be of the same general character as that already recommended for the junior and senior elementary day schools. Elementary evening schools should, in all cases, be *separate*, and the General Recommendation (n) respecting moral and religious instruction applies to them. In all other respects we recommend that the managers should be left free to adapt the instruction given in the schools to local requirements.

According to the New Code, the scholars in evening schools must be not under 12, nor above 18, years of age, and no attendance is reckoned unless the scholar has been under instruction in secular subjects for one hour and a half.

III.—SCIENCE AND ART CLASSES

Numerous classes for instruction in Science and Art are already in existence; their current expenses, and the remuneration of teachers, being defrayed, in part, by the grants paid upon the result of the annual examinations, and, in part, by pupils' fees.

These classes are usually held in the evening, and are frequently connected with evening schools.

The Science and Art Department comes into relation with these classes, and with the examination of the scholars taught in them, through the agency of Committees who voluntarily charge themselves with the responsibility of seeing that the regulations of the Department are carried out. The establishment of Science and Art Classes in connection with Public Elementary Evening Schools, therefore, would not involve the Board either in trouble or expense.

We recommend that the formation of such classes be encouraged and facilitated.

The Elementary Education Act does not confer upon a School Board the power of providing secondary schools, and it is silent as to the mode by which a connection may be established between the elementary and the secondary schools of the country. But it is of such importance to the efficiency of popular education that means should be provided by which scholars of more than average merit shall be enabled to pass from elementary into secondary schools, that we feel it our duty to offer some suggestions upon the subject.

The practical difficulty in the way of the passage of boys and girls from an elementary into a secondary school, is the cost of their maintenance; and the best way of meeting that difficulty appears to be to establish exhibitions equivalent to the earnings of boys and girls of from 13 to 16 years of age, tenable for the period during which they remain under instruction in the secondary schools. The funds out of which such exhibitions may be created already exist, and the machinery for distributing them has been provided by the Legislature in the Endowed Schools Act.

The Endowed Schools Commissioners have fully recognised the claims of scholars in public elementary schools to share the advantages of the endowed schools. We recommend, therefore, that the Board enter into official communication with the Endowed Schools Commissioners, and agree with them upon some scheme by which the children in public elementary schools shall be enabled to obtain their rightful share of the benefits of those endowments with which the Commissioners are empowered to deal.

T. H. HUXLEY (*Chairman*).

JOSEPH ANGUS
ALFRED BARRY
EDM. HAY CURRIE
EMILY DAVIES
LAWRENCE
BENJN. LUCRAFT
J. MACGREGOR
CHARLES REED
JAMES H. RIGG
WILLIAM ROGERS
EDW. J. TABRUM

JOHN G. CROMWELL—

Except that, looking to the three concluding clauses of the Report and to the sixth recommendation founded thereon, I feel unable to join in recommending that "Latin or a modern language may be taught to advanced scholars" in schools provided by the Board.

J. ALLANSON PICTON—

Except the application of General Recommendation (h) to public elementary evening schools.

SANDON—

Except that I object to the teaching of Latin or a modern language in primary public elementary schools; and that I also object to pronouncing any opinion in this Report upon the appropriation of existing endowments to the public elementary schools of London, as I do not consider that it is competent to a committee appointed by the School Board "to consider and report upon the scheme of education to be adopted in the public elementary schools" to consider, or make recommendations upon, this important subject.

MR. BENTHAM'S ANNIVERSARY ADDRESS TO THE LINNEAN SOCIETY

(Concluded from page 172)

FRANCE, without any special endemic character, unites within her limits portions of several biological regions, thus requiring from her naturalists the study of all the European Floras and

Faunas in order rightly to understand her own. The greater part of her surface constitutes the western extremity of that great Russo-European tract I have above commented upon, its flora, and probably also its fauna, here blending with the West European type, which spreads more or less over it from the Iberian peninsula. To the south-east she has an end of the Swiss Alps, connected to a certain degree with the Pyrenees to the south-west by the chain of the Cevennes, but at an elevation too low, and which has probably always been too low, for the interchange of the truly alpine forms of those two lofty ranges. South of the Cevennes she includes a portion of the great Mediterranean region; and the marine productions of her coasts are those of three different aquatic regions—the North Sea, the Atlantic, and the Mediterranean. The few endemic or local races she may possess appear to be on those southern declivities which bound the Mediterranean region; and if the volcanic elevations of Central France have a special interest, it is more from the absence of many species common at similar altitudes in the mountains to the east or to the south-west, than from the presence of peculiar races not of the lowest grades, with the exception, perhaps, of a very few species now rare, and which may prove to be the lingering remains of expiring races.

With so many natural advantages, French science, represented during the last two centuries by as great, if not a greater, number of eminent men than any other country, has long felt the necessity of a thorough investigation of the biological productions of her territory. The French Floras, both general and local, are now numerous, and some of them excellent. The geographical distribution of plants in France has also been the subject of various essays as well as separate works. It is only to be regretted that in the Floras themselves the instructive practice of indicating under each species its extra-Gallican distribution has not yet been adopted. In Zoology no general fauna has been attempted, since De Blainville's, which was never completed, and none is believed to be even in contemplation; but I have a long list of partial Faunas and Memoirs on the animals of various classes of several French departments; and Rey and Mulsant are publishing, in the Transactions of two Lyons Societies, detailed monographs of all French Coleoptera.

The progress of French naturalists in Biology in general up to 1867 has been fully detailed as to Zoology by Milne-Edwards, in his "Rapport sur les Progrès de la Zoologie en France;" and as to Systematic Botany by Ad. Brongniart in his "Rapport sur les Progrès de la Botanique Phytographique." The recent progress as to both branches, as well as in regard to other natural sciences, has also been reviewed by M. Emile Blanchard in his annual addresses to the meetings of the delegates of French scientific societies, held every April at the Sorbonne from 1865 to 1870. The Société Botanique de France had also up to that time been active, and the publication of its proceedings brought down nearly to the latest meetings. I am compelled, however, for want of time, to defer some details I had contemplated relating to the recent labours of French biologists; but I cannot refrain from inserting the following note on a work mentioned only, but not analysed, in the last volume of the "Zoological Record," obligingly communicated to me with other memoranda by Prof. Deshayes, whilst slowly recovering from a severe illness contracted during the German siege:—"In Mollusca we have also to regret that we have no complete work embracing the whole of this important branch of the animal kingdom. It is true that we make use of numerous works published in England, amongst which several are excellent, such as those of Forbes and Hanley, Gwyn Jeffreys, &c. Nevertheless I have to point out to you an excellent work published in 1869 by M. Petit de la Saussaye. The author, a very able and scientific conchologist, is unfortunately just dead. He has had the advantage of preparing a general catalogue of Testaceous Mollusca of the European Seas, possessing in his own collection nearly the whole of the species inserted, and of having received direct from the authors named specimens of the species foreign to the French coasts. This work is divided into two parts. The first is devoted to the methodical and synonymical catalogue of the species amounting to 1,150. In the second part, these species are distributed geographically into seven zones, starting from the most northern and ending with the hot regions of the Mediterranean. These zones are thus distinguished:—1, the Polar zone; 2, the Boreal zone; 3, the British zone; 4, the Celtic zone; 5, the Lusitanian zone; 6, the Mediterranean zone; and 7, the Algerian zone. Some years since it would have been impossible for M. Petit to have established the fifth zone, for that nothing, literally nothing, was known of the malacological fauna of Spain. Its seas were until 1867 less known than those

of New Holland or California. It was only in that year that Hidalgo published a well drawn up synonymic catalogue in Crosse and Fischer's "Journal de Conchyliologie."

The British Isles have less even than France of an endemic character in respect of biology. They form, as it were, an outlying portion of regions already mentioned, the greater part, as in the case of France, belonging to the extreme end of the great Russo-European tract. Like France, also, they partake, although in a reduced degree, of that Western type which extends upwards from the Iberian Peninsula. They are, however, completely severed from the Mediterranean as from the Alpine regions; their mountain vegetation, and, as far as I can learn, their mountain zoology, is Scandinavian; and if it shows any connection with southern ranges, it is rather with the Pyrenees than with the Alps. The chief distinctive character of Britain is derived from her insular position, which acts as a check upon the passive immigration of races, and is one cause of the comparative poverty of her Fauna and Flora; the isolation, on the other hand, may not be ancient enough or complete enough for the production and preservation of endemic forms. As far as we know, there is not in phænogamic botany, nor in any of the orders of animals in which the question has been sufficiently considered, a single endemic British race of a grade high enough to be qualified as a species in the Linnæan sense. How far that may be the case with the lower cryptogams cannot at present be determined; there is still much difficulty in establishing species upon natural affinities, and in some Lichens and Fungi, for instance, much confusion between phases of individual life and real genera and species remains to be cleared up. The study of our neighbours' Faunas and Floras is therefore necessary to make us fully acquainted with the animals and plants we have, and useful in showing us what we have not, but should have had, were it not for causes which require investigation; such, for instance, as plants like *Salvia pratensis*, a common European species to be met with in abundance the moment we cross the Channel, but either absent from or confined to single localities in England.

There is no country, however, in which the native Flora and Fauna has been so long and so steadily the subject of close investigation as our own, nor where it continues to be worked out in detail by so numerous a staff of observers. To the Floras we possess, a valuable addition has been made within the last twelve-month in J. D. Hooker's "Student's Flora of the British Isles;" the best we have for the purposes of the teacher, and in which the careful notation of the general distribution of each species is a great improvement on our older standard class-books. H. C. Watson's recently completed "Compendium of the Cybele Britannica" treats of the geographical relations of our plants with that accuracy of detail which characterises all his works. In Zoology, although we may not have compact synoptical Faunas corresponding with our Floras in all branches of the animal kingdom, the series of works on British Vertebrata published by Van Voort are a better and more complete account of our indigenous races than any Continental State can boast of; and I observe with much pleasure that in the new edition announced of the "British Birds," Mr. Newton proposes specially to follow out the determination of their geographical range, upon which Mr. Yarrell had bestowed so much pains. With regard to our Mollusca, we have been very fortunate. Forbes and Hanley's costly work, published by the Ray Society, has been followed by Gwyn Jeffreys's "British Conchology," the great merits of which as a Malacological Fauna of Britain have been fully acknowledged abroad as well as at home. The present geographical as well as the fossil range of the species is specially attended to, and the only thing missed is perhaps a general synoptical view of the characters of the classes, families, and genera into which the species are distributed. The Ray Society series comprises also several most valuable works on the lower orders of British animals; but the entomological fauna of our country, especially in relation to the insects of the adjoining Continent, notwithstanding the numerous able naturalists who devote themselves to its study, appears to be somewhat in arrear. In answer to my query as to works where our Insects are compared with those of other countries, I received from our Secretary, Mr. Stainton, the following reply:—"The questions you have put to me with reference to our entomological literature are very important; they, however, painfully call my attention to the necessarily unsatisfactory nature of my replies. Wollaston's "Coleoptera Hesperidum"* is the only separate

* Referred to in my Address of 1869.

work to which I can direct your attention as giving the fauna of a particular district, with the geographical range of such of the species as are likewise found elsewhere. R. M'Lachlan, who in 1865 had published (Trans. Ent. Soc. ser. 3, v.) a Monograph of the British Caddis-flies, gave in 1868 (Trans. Ent. Soc. for 1868) a Monograph of the British Neuroptera Planipenna, but little is there said of the European range of our species. In 1867 (Entom. Monthly Mag. iii.) Mr. M'Lachlan, who is one of our most philosophical writers, gave a Monograph of the British Psocidæ, and he there says with reference even to their distribution in our own country, 'As a rule, I have not mentioned special localities; these insects have been so little collected that an enumeration here of known or recorded localities would probably appear ridiculous in a few years.' The Rev. T. A. Marshall has given (Entom. Monthly Mag. i. to iii.) an essay towards a knowledge of the British Homoptera, in which occasionally allusion is made to the European distribution of our British species.

"The position of the Insect-fauna of Britain may be thus stated: the late J. F. Stephens commenced in 1827 a systematic descriptive work of all the orders of British Insects as 'Illustrations of British Entomology'; it ceased to appear after 1835, until a supplementary volume came out in 1846. The Lepidoptera, Coleoptera, Orthoptera, Neuroptera were wholly, the Hymenoptera partly, done, the Hemiptera and Diptera altogether left out. In 1839 Mr. Stephens published, in a more compendious form, a 'Manual of British Beetles.' In 1849 an attempt was made to supply the gaps in the British Entomology left by Stephens, and a scheme of a series of volumes called 'Insecta Britannica' was elaborated, in which Mr. F. Walker was to undertake the Diptera, Mr. W. S. Dallas the Hemiptera, and great progress having been made in our knowledge of the smaller moths since 1835, I undertook to write a volume on the Tineina. This scheme was so far carried out, that three volumes on the British Diptera by Mr. F. Walker (assisted by the late A. H. Haliday) appeared in 1851, 1852, and 1856, and my volume on the British Tineina in 1854. In 1859 another great group of the smaller moths was described by S. J. Wilkinson in a volume entitled 'The British Tortricæ.' The British Hemiptera, not having been done by Mr. Dallas, were undertaken by Messrs. Douglas and Scott for the Ray Society; and in 1865 a 40 volume was issued, containing the Hemiptera, Heteroptera, leaving the Homoptera for a second volume, still in progress. Even in this elaborate work little or nothing is said of the geographical distribution out of Britain of our British species. The same will apply to the late J. F. Dawson's 'Geodephaga Britannica,' published in 1854; to Westwood's 'Butterflies of Great Britain,' published in 1855; and to E. Newman's 'Illustrated Natural History of British Moths,' published in 1869.

"I believe I do not at all exaggerate if I say that for many years Entomology was pursued in this country with an insularity and a narrow-mindedness of which a botanist can scarcely form a conception. The system of only collecting British Insects was pursued to such an extent, that it was almost a crime to have a non-British insect in one's possession; if accidentally placed in one's cabinet it might depreciate the value of the entire collection, for Mr. Samuel Stevens can assure you that the value of the specimens depends very much upon their being indubitably and unmistakably British. A specimen caught in Kent which would fetch 2*l.* would not be worth 2*s.* if caught in Normandy. I satirised this practice several years since in the 'Entomologists' Weekly Intelligence' (vol. v. and 1858, articles 'Jeddo' and 'Insularity'), but it is yet far from extinct."

Perfectly concurring in Mr. Stainton's observations in the last paragraph, I would however add that there are purposes for which a local or geological collection distinct from the general one may be of great use, and such a collection would be much impaired by the introduction of stray foreign specimens. In a local museum, a separate room devoted exclusively to the productions of the locality is very instructive with reference to the history of that locality, and I have seen several such spoiled by the admission of exotic specimens, giving the visitor false impressions, which it takes time to remove. But it is never from such an exclusive collection that the fauna or flora of the district can be satisfactorily worked out, or that any branch of Zoology or Botany can be successfully taught.

Mr. Stainton adds, "It has been suggested to me that those who have critically studied the distinctions between closely allied species have rarely the time to work out in addition their geographical range, and that those who might work up the latter subject

might fail in their good intentions for want of a proper knowledge of species." Upon this I would observe that, in the due appreciation of a species of its limits and connections, its geographical range and the various forms it assumes in different parts of its area are an essential element; and it appears to me that the neglect of this and other general characters is one reason why many able naturalists, who have devoted their lives to the critical distinction of races of the lowest grades unduly raised to the rank of species, have really contributed so little to any science but that of sorting and naming collections. On the other hand, the study of geographical range without a proper knowledge of species is little more than pure speculation. Division of labour carried too far tends to narrow the mind, and rather to delay than advance the healthy progress of science.

Mr. Stainton informs me that "there has just appeared a monograph of the Ephemeridæ, by the Rev. A. E. Eaton (Trans. Entom. Soc. 1871), treating of those insects throughout the globe; and when any species are noticed which occur in this country, their entire geographical range is noticed. It is altogether a valuable paper, on account of the thoroughness with which it seems to be done."

Since I last noticed our biological publications two valuable and beautifully illustrated but costly Ornithological works, Selater and Salvin's "Exotic Ornithology," and Sharpe's "Monograph of the Alcedinidæ," have been completed, and various Memoirs by Flower, Mivart, Parker, and others, have considerably advanced our knowledge of the comparative anatomy of various groups of Mammalia. In our own country also, as well as on the Continent, the biology of various distant lands has continued to be worked out in Memoirs or independent publications, which I had contemplated noticing in succession; but time obliges me now to stop, and defer to a future occasion the compilation of the notes I had collected on North American, Australian, and other Monographs, Faunas, and Floras.

SCIENTIFIC SERIALS

THE *Geological Magazine* for June (No. 84) commences with some notes on Crinoids by Mr. John Rofe, relating rather to the zoological than to the geological aspects of that class of animals. Mr. Rofe describes some experiments made on recent Crinoids by treating them with solution of potash or muriatic acid, from which he arrives at the conclusion that their hard parts are invested by a membrane giving them a certain degree of flexibility, a general position which few naturalists will be inclined to dispute. But the details of structure described by Mr. Rofe will be found of much interest. In his concluding remarks he endeavours to show an approximation between the Crinoids and the Tunicata, which, to say the least of it, is very doubtful.—Mr. S. Allport publishes a note on the microscopic structure and composition of a rock from the "Wolf Rock" off the Land's End, which he identifies with phonolite, and justly protests against the system which gives different names to rocks identical in mineral composition because they happen to be of different geological ages.—Mr. D. Mackintosh describes the drifts of the west and south borders of the Lake district, with especial reference to their great granitic dispersions which he believes have taken place; and Messrs. C. and A. Bell discuss the divisions of the English Crags as indicated by their invertebrate fauna. They propose as the result of their investigations, to divide the Crag into Upper, Middle, and Lower; the Upper including the Norwich, and the upper part of the so-called Red Crag; the Middle, the remainder of the Red Crag; and the Lower, the Coralline Crag. The last paper consists of a comparison of the metamorphic rocks of Scotland and Galway, by Mr. G. H. Kinahan. The first and last of these papers are illustrated with plates.

The second part of Tome xliii. of the *Bulletin de la Société Impériale des Naturalistes de Moscou*, completing the first half volume for 1870, is the last portion of this publication that has yet reached this country. It contains the continuation of M. Ferd. von Herder's notice of the monoptalous plants collected by G. Radde and others (*Plante Raddeane Monoptalæ*) in Eastern Siberia, the Amurland, Kamtschatka, and Russian America, and includes references to numerous species of Compositæ.—M. N. Erschoff communicates a note upon the Lepidoptera of Western Siberia, containing a list of species from the town of Omsk.—A Russian paper on the Oligochaetal Annelid,